PLANT PROTECTION BULLETIN

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FAO PLANT PROTECTION BULLETIN

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FAO Plant Protection Bulletin

Vol. IV, No. 4 A Publication of the January 1956

World Reporting Service on Plant Diseases and Pests

Notes on Some Mealybugs *(Coccidae)* of Economic Importance in Ceylon

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THE *Coccidae* or scale insects of Ceylon were the subject of a now classical taxonomic treatise by Green (3). This report covers studies on the economic importance of several species of mealybugs, undertaken as part of an FAO project, in the Entomology Section, Department of Agriculture at Peradeniya in 1953.

Included are the results of experiments on the transmission of cacao virus, the confirmation of a previous diagnosis of mealybug wilt of pineapple by experimental mealybug infestations and the establishing of a *Pseudococcus* sp. as the cause of a malformation of kapok (*Ceiba pentandra*) seedlings.

Cacao Virus

Cacao virus disease was first noted in 1949 by J. W. L. Pieris of the Ceylon Department of Agriculture, who submitted leaves showing the typical oak-leaf pattern to A.F. Posnette, then of the West African Cacao Research Institute, for diagnosis.[2] Posnette confirmed Pieris' opinion that the symptoms were similar to a strain of swollen shoot in West Africa. Although my own experience with the swollen shoot disease complex was limited to a few months spent as a member of the Swollen Shoot Commission, the leaf symptoms as observed in the Peradeniya area were typical of those seen in West Africa, although the rounded fruit was seen only once, and the swelling of the stems not at all. The leaf symptom is a striking oak-leaf pattern (Figure 1).

In view of the diagnoses on the basis of leaf symptoms, the known role of mealybugs as vectors, and the frequency of mealybug infestation on cacao in Ceylon, the necessity for the testing of these mealybugs was clearly indicated.

Three species of mealybugs were found on cacao. Of these, *Pseudococcus lilacinus* (Cockerell) was by far the most common. *P. citri* (Risso) and *Ferrisia virgata* (Cockerell) were found only on occasion, the latter being almost invariably associated with the flower pads on the tree trunks.

The technique of transmission was essentially that described by Posnette (4) with a modification that eliminated the dissection of the bean. The latter resulted in too high a percentage of rotted beans under the local conditions for growing the seedlings. Beans were washed clean and set in large Petri dishes on moist paper. Large numbers of mealybugs from diseased trees were then introduced into these dishes and a fair proportion settled on the beans. From two to four days later, the beans were planted in flats and grown in a large screened cage.

Using this technique, positive results were obtained with *Pseudococcus lilacinus*

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[1] Economic Entomologist (Tropical), Agriculture Division, FAO, 1953.

Acknowledgment is extended to Dr. H. E. Fernando, Chief of the Entomology Section, Ceylon Department of Agriculture, and his staff for their co-operation which made these investigations possible.

[2] Oral communication.

Figure 1. Cacao leaves showing the typical oak-leaf pattern of swollen shoot disease.

and *P. citri.* Experiments with *Ferrisia virgata* were inconclusive up to the time I left Ceylon. In the positive cases, the first symptom was vein-clearing, which developed in approximately two months. The typical oak-leaf patterns developed on later flushes.

The experimental results made it clear that mealybugs are the vectors of cacao virus in Ceylon, and indicate equally clearly that the virus is closely related to the swollen shoot complex of West Africa. In the absence of comparative yield records, no positive estimate can be made of the debilitating effects of the virus disease on the tree but from observation in the field on the vigor of infected trees, it seems likely that the disease is actually a mild one. Sickle-leaf (a deficiency disease), the activities of *Helopeltis*, and black-pod disease (*Phytophthora palmivora*) are probably of far more economic importance. Even granting this to be true, however, control of cacao virus is desirable. Fortunately most of the cacao plantings in Ceylon are plantation style and except for extremely hilly locations, lend themselves in some degree to mechanical spray control methods. Formicidal sprays could well be combined with sprays against *Helopeltis* and with suitable formulations effective against black-pod disease. Cutting out of diseased trees would need to be resorted to only in the most extreme cases. This solution, however, will require the accumulation of more basic data than was available at the time, on the one hand, and the informed co operation of the cacao growers on the other.

Mealybug Wilt of Pineapple

This disease of pineapple, induced by the feeding of *Pseudococcus brevipes* Cockerell is found throughout the tropics wherever pineapple is grown. It is definitely a condition which continuous growing of pineapple on the same land encourages but is rarely serious in the one-cycle culture so often practiced in these areas.

In Ceylon, the mealybug is found attended principally by the fire ants *Solenopsis* and, as is typical in such cases, in rather isolated patches often with a huge nest built around a mealybug-infested plant. Even so, however, by the time the plants have fruited and slips and suckers are produced, mealybugs can be found on a high percentage of the vegetative planting pieces used for new plantings.

Figure 2. Mealybug wilt of pineapple in a grower's field.

Figure 3. Experimentally induced mealybug wilt of young pineapple plants.

In the area near Colombo where pineapple has been planted on land cleared of old rubber and coconut plantings, mealybug wilt is a serious matter to many growers (Figure 2).

The purpose of the experiment which was performed was to confirm the diagnosis made on the basis of symptoms. In this experiment, leaves were pulled from large apparently normal plants growing in a field where patches of wilted plants were common. Gravid females of *Pseudococcus brevipes* were caged on these leaves and after large colonies of first instar larvae had developed, these were used to infest healthy young plants by cutting out the section of leaf on which the cage had been set and dropping this into the heart of the plant, leaving the mealybugs to move off as the leaf section dried up.

Two months later typical symptoms of mealybug wilt had developed (Figure 3) on some of the infested plants and later reports indicated that a high percentage had wilted.

The experiment was adequate to confirm the diagnosis and to demonstrate to the growers the relationship between the insect and the disease.

The fumigation of planting material, already recommended by the Entomology Section, Ceylon Department of Agriculture, would seem to be the most logical control measure for the small grower to adopt with the aid of fumigation facilities provided by the Government.

Mealybug Green-spot of Pineapple

This toxic effect, localized at the insect's feeding point, was present in a mild way on pineapple leaves in Ceylon. It is a distinctly different disease from mealybug wilt and of no economic significance unless developed to extreme on very small plants.

Of interest from the standpoint of the geographical distribution of mealybug strains, the symbionts of *Pseudococcus brevipes* in Ceylon did not include the rod-shaped form. In this respect they are similar to specimens examined in Tanganyika and Malaya (2) and different from those in Hawaii and Central and South America. There, green-spotting is associated with the presence of various rod forms in the mycetomes of *P. brevipes* (1, and unpublished data).

Figure 4. Kapok seedlings with growing points malformed as a result of mealybug feeding.

Savoy Curl of Kapok

Young kapok seedlings showing a savoy-like curling of both terminal and lateral shoots (Figure 4) were received from an estate. The plants were infested with a mealybug determined as *Pseudococcus* sp. Because of this incomplete identification it can be noted that the insect produces an egg mass enclosed in an almost parchment-like sac. Its mycetome is orange-red in color and the included symbionts blunt, sausage shaped, some curled, and somewhat similar to those of *P. citri.*

The symptoms on the kapok were diagnosed as probably due to the toxic feeding of the mealybug and experimental evidence confirmed this. Mealybugs caged on young healthy kapok produced the symptoms very rapidly, and there was a clear relationship between the numbers of mealybugs and the severity of the symptom. When the mealybugs were killed by spraying with malathion, the symptom development ceased and new growth was normal.

Summary

Cacao virus, similar in symptoms to some of the West African strains, was transmitted from cacao to cacao by *Pseudococcus lilacinus* and *P. citri.*

Mealybug wilt of pineapple was diagnosed on the basis of symptoms and the diagnosis confirmed by experimental infestations of healthy plants by *Pseudococcus brevipes.*

Green-spotting of pineapple leaves was found associated with *Pseudococcus brevipes* and the mycetomes of insect do not appear to contain the rod-like form present in other areas.

A savoy curl of kapok was shown to be due to the feeding of a *Pseudococcus* sp.

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The Value of Plant Health Certificates

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Dr. Briejer[1] has published a very interesting and stimulating article on the value of phytosanitary certificates. He states that "there is no reason why the wording of the certificate should be important." In his last paragraph he hopes his note will stimulate further consideration of the subject and I should like to take this opportunity to express a totally contrary opinion. The actual wording of the plant health certificate is, I submit, of vital importance, and great care should therefore be taken in its wording.

Dr. Briejer and I agree on the factors for satisfactory inspection, as given by him in three numbered paragraphs in his article, though these might with advantage be extended to include the inspectors themselves as also requiring a sense of responsibility.

In order to consider the value or otherwise of the plant health certificate let us take an actual example. Kenya is free from the tomato spotted wilt disease (*Lycopersicum* Virus 3 K.M. Sm.) and is strictly concerned to keep it out. For entry to Kenya of herbaceous hosts of the disease (actually all herbaceous plants which might be hosts), certification of inspection during active growth is required. Now let us consider two possible plant health certificates:

1. "The plants were examined and found to be substantially free from injurious pests and diseases."
2. "The plants were examined during active growth and found, or believed, to be free from the tomato spotted wilt virus."

The first certificate is of little or no value, because it implies a tolerance. However little this tolerance may be, the importation of a number of consignments so certified will result in the introduction, and probably the eventual establishment of the disease. On the other hand the second certificate, granted competence and good faith on the part of the inspector, excludes any consignment showing any spotted wilt at all, and therefore offers the maximum protection possible at that stage, under the permit and inspection system. The wording of the required certificate is therefore of vital importance.

Where there is definite lack of good faith or responsibility a certificate is of course worthless, but it is conceivable that a carefully worded certificate may be of value even if an inspector may be somewhat lacking in energy or competence. The request for a certificate worded as follows: "certified that the plants are substantially free from pests and diseases," may result in an inspector giving only a cursory inspection since this satisfies the requirements, and "substantially" if not carefully defined allows a subjective decision by one man, who may allow the passing of an appreciable amount of disease even with good faith on his part. A certificate stating that "after careful inspection no pests or diseases were found" cannot be filled by a man of good faith without both a careful inspection, and the freedom of the plants from visible pests and diseases. Again therefore the wording is shown to be vital.

Dr. Briejer remarks that if the plant protection service concerned has established its reputation, a simple certificate stating that the service has inspected the consignment, e.g., "seen by the Plant Protection Service of Gondwanaland," with signature and seal, is sufficient. This is true only if agreement has been reached between the plant protection services of Gondwanaland and the importing country as to what the latter particularly wants to keep out, and what type of inspection it wishes to have

[1] C. J. Briejer. 1954. The value of phytosanitary certificates. FAO Plant Prot. Bull. 2 : 177-178.

made. This agreement can be reached only as a result of very careful wording, and if this careful wording has to be done at some time, why not put it on the certificate too?

Dr. Briejer suggests " one standard certificate for the whole world," but it is certain that, in many cases, this would only be worth the paper on which it was printed because it could not include the special requirements needed to assist in keeping special diseases out of special countries. To what extent an exporting country can go in serving an importing country by plant inspection designed to ensure freedom from a specified pest or disease, will of course depend on the finances and staff available to the plant protection service, and on the technical knowledge and general competence of the inspecting staff. Where an important disease is to be kept out, only when the importing country is satisfied that inspection to ensure freedom from the particular disease will be carefully made, will it be able to issue permits to import from that country. In practice this is arranged by correspondence, the plant protection service of the exporting country stating what kind of inspection they can make, and suggesting how reliable it is likely to prove. A country may state that they can give the usual " tolerance " certificate, but not the carefully worded " freedom " certificate, and a decision will then have to be taken as to whether importation from that country can be permitted.

What is required of a certificate under the certification system? The certificate may be wanted for plants, when the same species exists in the importing country with all the major diseases and pests already present, or for plants on which serious diseases are unknown. Here the " substantially free " certificate might be considered adequate as it is required only to ensure that heavily infested material is not sent. The certificate may be needed for plants which in the country of origin are liable to be infected with a disease which does not occur in the importing country. Then careful attention should be given to the wording of the required certificate. This should consider whether the disease is severe, of limited or extended host range, whether the normal host list contains major crops in the importing country, whether the disease is readily recognizable on the host plants in the country of origin at the time of despatch, and other similar details. If not severe and of limited host range, an inspection at time of shipment stating " found or believed free from pests and diseases " will suffice: but let us get away from " substantially free " which means little or nothing. If the plants are liable to be infected with a severe virus disease attacking many host plants, and not recognizable with certainty on plants in a dormant stage, then " inspected during active growth and found or believed free " will be required. Great care must be given to the wording, to ensure that nothing more stringent is asked than is necessary, so as not to interfere unduly with the trade in plants; but it must be sufficiently stringent to achieve its object in preventing or delaying the spread of injurious diseases.

To conclude, I reiterate my opinion that the wording of the required certificate is important and needs to be very carefully considered. If this is done, and the inspectors carefully comply with what is asked of them by the conditions specified for the plant health certificate, then the certification system will prove a real protection.

Occurrence of Bacterial Blight of Cotton in Peru

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BACTERIAL blight of cotton caused by *Xanthomonas malvacearum* (Smith) Dows., was recognized for the first time in Peru by the writer at the beginning of March 1955. Under various common names, such as blackarm, angular leaf spot, bacterial boll rot, and gummosis, this disease has been reported from many countries as one of the most destructive diseases affecting cotton. In South America, it was previously known to exist only in Colombia, Brazil and Argentina.

The symptoms of this disease observed in Peru are not different from those recorded in other parts of the world. They include the dying of young plants as soon as they emerge from the soil; lesions on cotyledons, leaves and stems often resulting in defoliation and girdling of the stem; leaf curling; spots with a water-soaked appearance on flower bracts causing the shedding of flower buds; decay and dropping of bolls.

The first incidence of this disease was observed on the Esmeralda farm located on the left bank of the Chira river, at the high elevation side of the valley, affecting a field of about 7 hectares with 95 percent of the plants diseased. Subsequently it was observed on more than 20 farms at various elevations of the valleys Chira and Piura, with infected plants varying from traces to 100 percent. Both valleys are situated in the northwestern corner of the country, near the Ecuadorian border.

The presence of the bacterial blight in a number of farms in the two valleys during the 1955 growing season indicates that the disease has already spread to a considerable extent, the main medium of dissemination being the infected seed. A high proportion of the seed from the affected area was found to be infected, which would serve as the source of primary infection. In addition to rain, wind and insects (mainly cotton stainers), the volunteer plants in the field and the flooding system of irrigation commonly practiced in that area obviously facilitate the further dissemination of the disease.

Under field conditions the disease was observed affecting only the long-fiber cotton variety Pima, but experimentally the varieties Acala, Karnack, and Tanguis proved to be also susceptible. The presence of this new disease in the Chira and Piura valleys therefore not only created one more pathological problem for the cultivation of Pima cotton in that area, but it also constitutes a serious threat to other valleys where the variety Tanguis is widely grown.

Despite the high proportion of plants attacked by bacterial blight during the 1955 season, the damage thus produced was hardly appreciated by the growers, mainly due to the attention given to the losses caused by insects. During the surveys it was found that in addition to a considerable number of young cotton plants killed by the disease, a high percentage of bolls failed to open either due to disease infection or to the injuries caused by cotton stainers (*Dysdercus* spp.).

At present the following methods for controlling the bacterial blight have been recommended to the cotton growers in the Chira and Piura valleys:

(*a*) disinfection of all the seed to be sown in the 1956 season with an organic mercury fungicide, such as Granosan M;
(*b*) burning of plant remains at the end of the growing season and early cultivation to destroy volunteer seedlings;
(*c*) replacing the present flooding irrigation system by furrow irrigation.

It is being planned to study cotton varieties introduced from the United States and the Sudan in order to develop resistant varieties adaptable to local conditions.

Plant Disease Situation in the United States [1]

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Downy Mildew of Grasses and Occurrence of Sporangia

ARNOLD J. Ullstrup, of Purdue University, Lafayette, Indiana, writes that goose-grass (*Eleusine indica*), love-grass (*Eragrostis pectinacea*), stink-grass (*Eragrostis cilianensis*), green foxtail (*Setaria viridis*), and crabgrass (*Digitaria sanguinalis*) were found with the typical crazy top symptoms, resulting from infection by the downy mildew fungus. The disease had been reported on the two last-named grasses but the other three appear to be new hosts. Sections of leaves and stems revealed the presence of oöspores similar in size, shape and color to those of *Sclerophthora macrospora* (Sacc.) Thirum., Shaw & Naras. (= *Sclerospora macrospora* Sacc.).

Infected plants were found in an area approximately 100 × 300 ft. on the campus of Purdue University, which had been excavated to a depth of 3 to 4 ft. two years before in preparation for construction. The top soil had been removed leaving the gravelly subsoil exposed. The surface of the excavated area was uneven and numerous depressions provided for the formation of puddles where water stood for varying lengths of time. Infected plants were found on the margins of these puddles. This observation indicates the apparent necessity for flooding or water-logging for infection to take place.

Symptoms on goose-grass were most conspicuous. The barren heads were reduced to a thick, bunchy mass of proliferated bracts (Figure 1). Leaves and stems were shortened and often showed light green striations. Symptoms on green foxtail and stink-grass were characterized by malformation of the heads and in general were similar to those found on goose-grass. Infected plants of love-grass and crabgrass produced heads infrequently. In these latter two species the conspicuous symptom was the bunched or cushion-like appearance (Figure 2) in contrast to the spreading of healthy plants. The bunchy condition was due, apparently, to marked shortening of the internodes. Leaves were much reduced in length and width. Another characteristic symptom on these two grasses was the fine, light-green to yellowish mottling of the leaves. These minute pellucid dots when sectioned or cleared were found to be "nests" of oöspores embedded in the tissue. The symptoms on these wild grasses are generally similar to those on maize (*Zea mays*) affected by the same disease.

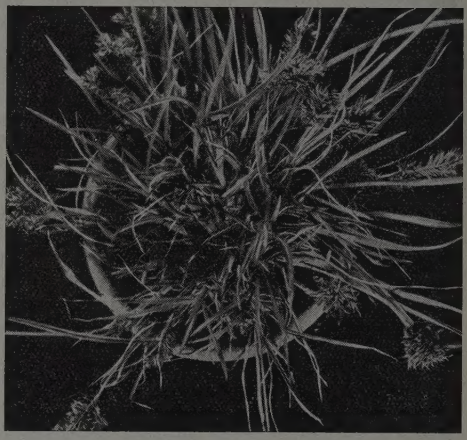

Figure 1. Goose-grass (*Eleusine indica*) infected with downy mildew.

Diseased plants of love-grass, goose-grass, stink-grass, and crabgrass, established in pots, were placed in moist chambers to induce formation of sporangia on the surface of the leaves. After a 48-hour period during which

[1] This report is based upon material submitted by Collaborators of the Plant Disease Epidemics and Identification Section, Agricultural Research Service, United States Department of Agriculture.

Figure 2. Crabgrass *(Digitaria sanguinalis)* infected with downy mildew, showing bunchy growth and absence of heads.

the leaves were covered with a film of water, leaves and scrapings of leaves were examined for the presence of sporangia. Only on crabgrass were sporangia found, and then in sparing numbers. Sporangia were lemon-shaped, colorless to faintly greenish, granular, and resembled those of *Phytophthora*. They were borne on short, simple or 2- to 3-branched sporangiophores issuing from the stomata. Attempts to germinate sporangia in water at 16°, 22°, and 30° C. were unsuccessful. Efforts were made to induce infection in goose-grass, love-grass and crabgrass by growing plants from seed of these grasses in soil taken from around the roots of diseased plants in the field. Pots in which plants were growing were flooded for periods of 24, 48 and 72 hours under cool (65° F.) and warm (80° F.) temperatures, and when seedlings were just emerging and when seedlings were 3 inches high. In no instance was there evidence that infection was established.

A number of maize plants affected with crazy top were found in a maize-breeding nursery near Lafayette, Indiana. One of these plants was severely affected and bore the typical narrow, strap-like and striated leaves. Neither staminate nor pistillate inflorescences developed on this plant. Microscopic examination of scrapings from the surfaces of leaves when the latter were still covered with dew showed a few typical sporangia (Figure 3). Successive crops of sporangia were observed on subsequent mornings whenever leaves were wet with dew. The sporangia were strikingly similar to those found on crabgrass. They measured 20-84 × 62-109 μ averaging 58 × 83 μ. Sporangiophores were hyphoid, simple or 2- to 3-branched, and 10 to 15 μ in length. The sporangia and sporangiophores resembled closely, in size, shape and color, those described by Thirumalacher *et al.* for *Sclerophthora macrospora* on *Eleusine coracana*.

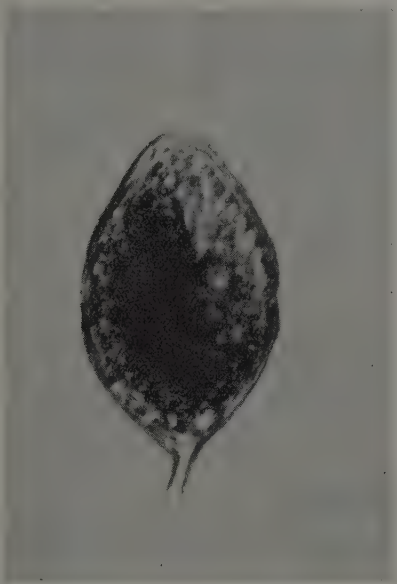

Figure 3. A sporangium of *Sclerophthora macrospora*. Sporangia were found very sparingly on crabgrass and maize leaves.

Many maize plants affected by crazy top have been examined in the field and in moist chambers in the greenhouse for the presence of sporangia, but none have been found until this single instance.

Outbreaks and New Records

Puerto Rico

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Frankliniella sp. on Mango: a First Record

A thrips, an unidentified species of *Frankliniella*,[1, 2] has been found to cause extensive damage to unopened buds and expanding flowers of mango (*Mangifera indica*) in Puerto Rico. The females of these minute insects have a saw-like ovipositor with which they penetrate the buds to deposit their eggs inside the young flower, sometimes within the ovary. The eggs hatch and the immature forms feed on the developing pollen and floral tissues, particularly the ovary and the fleshy disc upon which it rests. All stages from eggs to mature forms were noted in living flowers and sectioned material.

Flowers of the following mango varieties were studied with regard to thrips injury: Amini, Cambodiana, Divine, Martinique, Mullgoa, and Totafari. An average of almost 1,000 flowers was examined from each of these six varieties and the average incidence of thrips injury was about 31 percent. Cambodiana was the most susceptible, with 74 percent of its flowers damaged, while Divine, with only 8 percent of its blooms attacked, was the least susceptible of the varieties studied.

This is the first record of a species of *Frankliniella* attacking young mango flowers. The thrips, although unidentified as to species, is a member of the *cephalica* group and is allied to *F. borinquen*.[2]

[1] ANDERSON, W. H. Communication dated 28 June 1955.
[2] HOOD, J. D. Communication dated 25 October 1955.

Southern Rhodesia

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Storage Insects

Khapra beetle. Following the discovery of the Khapra beetle (*Trogoderma granarium* Everts) at Bulawayo in February 1955, this insect has now been found at Gwelo, Salisbury (in several localities) and Glendale. Some of the localities in which it is now known to occur were carefully examined in 1953 and 1954 and it was not found then. All the evidence points to it being a recent arrival but it is already widespread.

Flour beetle. The long-headed flour beetle (*Latheticus oryzae* Waterhouse) has been found abundantly in stored grain at Aspindale near Salisbury. It does not seem to have been found in Southern Rhodesia before, but it could easily have been overlooked.

African Army Worm

Larvae of the African army worm (*Laphygma exempta* WIK.) were found in outbreak numbers early in November 1955. They occurred in uncultivated ground which had received a freak hailstorm in mid-October. This occurrence was followed by a widespread, but rather diffuse, outbreak of the larvae all through December.

Chilo on Rice

A species of *Chilo* was bred from borers in the stems of rice and rapok (*Eleusine coracana*). This appears to be the first record of a moth of this genus in Southern Rhodesia.

Plant Quarantine Announcements

Italy

Ministerial Decree of 26 October 1955, published in the *Gazzetta Ufficiale della Repubblica Italiana* Vol. 96, No. 256, 7 November 1955, contains regulations governing the importation of seed potatoes for the 1955/56 crop year.

The Decree authorizes under specified conditions the importation of seed potatoes for the 1955/56 crop year free of customs duty up to 350,000 quintals. Importation must take place before 15 April 1956, through one of the following customs offices: Como, Domodossola, Fortezza, Verona, Pontebba, Ancona, Genova, Savona, Leghorn, Venice, Naples, Bari, Catania, Modena, Turin, Ventimiglia, Tirano (Sondrio), Palermo, Messina, Cagliari.

The importer of seed potatoes under the terms specified in the Decree must submit a request to the Ministry of Agriculture and Forestry and, if approved, will be issued with an import permit.

Seed potatoes to be imported must originate from crops grown specifically for seed production, in compliance with the legislation of country of origin and with the Italian requirements. The produce must belong to the highest grade in accordance with the seed potato classification established by the producing country. The importation of potatoes of grades immediately inferior may be permitted only in special cases.

The phytosanitary condition and genetical qualities of seed potatoes imported must be guaranteed by the competent inspection service of the country of origin. The tubers must be sound, clean, well-formed and possess all the characteristics of the declared variety. Produce originating from plants infected by virus diseases or originating from localities infested by ring rot (*Corynebacterium sepedonicum*), wart disease (*Synchytrium endobioticum*), flea beetles (*Epitrix cucumeris, E. fuscula*), and potato tuber worm (*Phthorimoea operculella*), or any other pests not permitted by the producing country in potato grading shall be prohibited importation.

The seed potatoes must be imported and distributed in original containers, sealed by the inspection service of the country of origin and provided with a label indicating the variety, the genetical classification, and the name and address of the producer.

Each consignment must be accompanied by a phytosanitary certificate in accordance with the model provided in the Decree, which is similar to the model certificate annexed to the International Plant Protection Convention of 1951. Additional declarations giving the following information must be included in the certificate.

A. *Declaration on the origin and health of the produce*

a. The consignment found to be free from wart, worm, scab and other disorders; the name of the producing farm and its locality.
b. The producing farm found to be free from *Corynebacterium sepedonicum, Synchytrium endobioticum, Epitrix* spp. and *Phthorimoea operculella.*
c. The above-mentioned parasites not found within 2 km. of the field where the potatoes were harvested.
d. New packing material being used for the consignment.
e. Each container being sealed officially by the officer who signs the certificate.
f. Freedom from soil.

B. *Declaration regarding the consignment*

a. Variety.
b. Genetical classification.
c. Marks on the container provided by the producer for indicating the genetical classification.
d. Number of the wagon.
e. Name and address of the holder of the import permit.

C. *Declaration on field control*

Indicating the fields subject to rigid selection and control and found to be free from virus diseases.

United States

Foreign Plant Quarantine No. 8 concerning foreign cotton and covers of 10 April 1953 (see FAO Plant Prot. Bull. 1 : 141-142, 1953) was amended effective 26 December 1955. The amended text was published in the Federal Register 20 : 8660, 24 November 1955, as Foreign Quarantine Notice 319.8.

The amendments modify some of the requirements of the regulations for entry of cotton, certain cotton products and covers. The principal modification requires that in most instances importation of bagging used for root crops, or of a kind ordinarily used for root crops, regardless, of origin

must be fumigated upon entry in accordance with a method determined by the inspector. An exception to this restriction is that such bagging from Canada may be imported without treatment, unless the bagging is found to be contaminated. This precautionary measure is required because of the impracticability of determining whether such bagging has previously been used for root crop produced on soil infested with the golden nematode (*Heterodera rostochiensis*), and because of the present lack of knowledge concerning golden nematode distribution in other countries. In the 1953 Notice, fumigation was required only where such covers originated from European countries and non-European countries (Canary Islands and Peru) in which the golden nematode was known to occur, or when such covers from other countries were found to be contaminated.

Other modifications are made in the 1955 Notice for the sake of clarification.

Uruguay

A Decree of 26 July 1955, published in the *Diario Oficial* No. 14592, 12 August 1955, amends the Decree of 17 June 1938 in relation to the importation of certain seeds. Under the new Decree, the importation is prohibited of seeds for sowing purpose of cereals, oil crops, forage grasses, legumes and sorghums, which have not been tested by the Estanzuela Institute of Plant Industry and National Nursery or by the Official Seed Distribution Service, or which have not given favorable results in the tests. Previously only such seeds of wheat, flax, oats and other cereals were prohibited.

Yugoslavia

An Order of 3 June 1955, published in the *Sluzbeni List* No. 43, 28 September 1955, establishes the following frontier points at which land- and water-borne imports, transits and exports of plant materials must take place.

By railway, road, etc.:

Vršac, Dimitrovgrad-Gradina, Devdelija, Jesenice, Kikinda, Maribor, Nova Gorica, Sežana, Subotica, Kotoriba;

By sea:

Ploče, Bar, Dubrovnik, Rijeka, Split, Hercegnovi-Zelenika, Sibenik, Koper;

By river:

Bezdan, Veliko Gradište;

By postal parcels:

Belgrade, Zagreb, Ljubljana, Sarajevo, Skoplje, Titograd.

News and Notes

International Congress of Entomology

The Tenth International Congress of Entomology will be held in Montreal, Canada, 17-25 August 1956. The meetings will take place at McGill University and the University of Montreal. Dr. W. R. Thompson of the Commonwealth Institute of Biological Control and Dr. J. A. Downes of the Division of Entomology, Canadian Department of Agriculture, have been elected the President and the Secretary of the Congress, respectively.

According to its first announcement, the following sections of the Congress have provisionally been arranged to cover the whole range of entomological science:

1. Systematics
2. Morphology and anatomy
3. Physiology
4. Behavior
5. Ecology
6. Geographical distribution
7. Genetics and biometrics
8. Palaeontology
9. Arachnida and other land Arthropods
10. Agricultural entomology
11. Forestry entomology
12. Medical and veterinary entomology
13. Biological control
14. Apiculture.

Symposia will be organized in many of the sections. An extensive program for agricultural entomology, which will include a discussion on locusts and grasshoppers, is being scheduled. During and after the Congress, a number of excursions, including a visit to the Science Service Laboratories, Ottawa, will take place.

The detailed program of the Congress will be announced shortly. For further information, enquiries should be addressed to J. A. Downes, Division of Entomology, Science Service Building, Ottawa, Ontario, Canada.

Roma - Tip. del Senato del dott. Giovanni Bardi

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